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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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10/696,788

10/30/2003

Shufeng Han

16569-US

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7590

12/31/2008

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MOLINE, IL 61265

EXAMINER

DIACOU, ARI M

ART UNIT

PAPER NUMBER

3663

MAIL DATE

DELIVERY MODE

12/31/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

|                              |                                      |                                   |  |
|------------------------------|--------------------------------------|-----------------------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b><br>10/696,788 | <b>Applicant(s)</b><br>HAN ET AL. |  |
|                              | <b>Examiner</b><br>ARI M. DIACOU     | <b>Art Unit</b><br>3663           |  |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 02 September 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 21-30 and 41-45 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 21-30 and 41-45 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Response to Arguments***

1. In the remarks filed 9-2-2008, applicant argued that the cited art fails to teach or suggest all aspects of the claimed invention. These arguments are rendered moot in view of the new grounds of rejection which appears below.

### ***Claim Rejections - 35 USC § 103***

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was

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not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 21-30 and 42-45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Quincke (USP No. 6345231) in view of Keller (USP No. 6199000).

- Regarding claim 21, Quincke discloses a method of guiding a vehicle, the method comprising:
  - determining location data, including a particular location of a vehicle, within the work area; [Xp, Yp, Zp; Col. 3, line 24]
  - estimating at least one of roll data [ $\alpha$ ] and pitch data [ $\beta$ ] corresponding to the particular location [Col. 3, lines 10-24], the roll data associated with a corresponding lateral slope [Col. 3, lines 19-22], the pitch data associated with a corresponding longitudinal slope generally perpendicular to the lateral slope, wherein each of the roll data and pitch data are separately estimated using
    - i) a maximum slope of ground [ $\alpha$  or  $\beta$ ] with respect to a reference point [Xp, Yp, Zp] for each cell traversed by the vehicle corresponding to the particular location, and the maximum slope having a non-zero longitudinal slope component [Col. 9, lines 7-20] and a non-zero lateral slope component [Col. 8, line 60 - Col. 9, line 6], and

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- ii) an aspect angle between a direction of the maximum slope and an axis with which a direction of travel is coincident [Quincke discloses alignment angle  $\Phi$  which is in the N-S-E-W plane, and therefore the aspect angle  $\Phi$  will be between the two directions claimed];
- guiding the vehicle steering in a direction of travel with compensation data based upon at least one of the estimated roll data and the pitch data such that an actual path of the vehicle follows a target path [Col. 9, lines 32-65]

but fails to disclose:

- establishing elevation data and corresponding location data for a work area divided into cells;

Keller also teaches an agricultural vehicle which uses high-precision differential GPS to plant crops. Keller further teaches that his device uses GIS data of where seeds will go in the field [Col. 7, lines 56-67]. Keller teaches in Fig. 1, that the GIS data includes a grid broken up into cells [Fig. 1, "base map"] and includes an elevation layer [Fig. 1: "elevation"] Therefore, "establishing elevation data and corresponding location data for a work area divided into cells" would have been obvious to one skilled in the art (e.g. a robotics engineer) at the time the invention was made, for the advantage of guiding a planter along a hill as taught in Keller in Figs. 5 and 8.

- Regarding claim 22, Quincke discloses " $\alpha$ " and " $\beta$ ".
- Regarding claim 23, Keller discloses Fig. 1, base map and elevation layers.
- Regarding claim 24, Keller discloses Col. 7, lines 3-23 and 44-67.

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- Regarding claim 25, Quincke discloses Col. 9, lines 43-47.
- Regarding claims 26, 27, 42 and 43, Keller discloses Col. 11, line 48 – Col. 12, line 7.
- Claims 28 and 30 are merely the methods by which one of ordinary skill would normally calculate pitch and roll angles.
- Regarding claim 29 and 45, Quincke discloses Col. 9, lines 33-42.
- Regarding claim 44, Quincke discloses that the resolution is in centimeters Col. 1, line 17.

6. Claim 41 is rejected under 35 U.S.C. 103(a) as being unpatentable over Quincke and Keller as applied to claims 21-30 and 42-45 above, and further in view Stewart (NPL). Quincke and Keller discloses the invention with all the limitations of claim 21, but fail to disclose that the aspect represents the radial direction of maximum slope. Stewart teaches that for any surface, the direction of maximum slope is unique [Pages 806-807, and Figs. 9 and 10]. Therefore, it would have been obvious to one skilled in the art (e.g. a robotics engineer) at the time the invention was made, to create a coordinate system that was linearly dependent on the normal to the surface, the direction of maximum ascent, and the direction of vehicle travel, for the advantage of having two of the three vectors unique and linearly independent for any point on a 3D surface.

### ***Conclusion***

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7. The references made herein are done so for the convenience of the applicant. They are in no way intended to be limiting. The prior art should be considered in its entirety.
8. The prior art which is cited but not relied upon is considered pertinent to applicant's disclosure.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Ari M. Diacou whose telephone number is (571) 272-5591. The examiner can normally be reached on Monday - Friday, 8:30 am - 5:00 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jack Keith can be reached on (571) 272-6878. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

/A. M. D./

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31-Dec-08

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/Jack W. Keith/

Supervisory Patent Examiner, Art Unit 3663